All Actuaries Summit
New age, new actuary

11-13 June 2025, Sydney

Managing retirement risks in the personal financial lifecycle

Prepared by Anthony Asher

Presented to the Actuaries Institute
2025 All-Actuaries Summit
11-13 June 2025

Abstract

Australians must navigate the risks from an array of financial products and services through their adult lives, but this requires an unattainable level of financial literacy or unaffordable financial advice. A particular problem is that planning for retirement in the Australian superannuation system assumes that the equity market is the most suitable avenue for investment. It exposes individuals to investment and longevity risks they may not fully understand.

The Moneysmart website, sponsored by government, provides information and calculators spanning the lifecycle. It reflects the current state of the system and acts as something of a template for the industry. It therefore offers a useful framework for evaluating the way in which the system falls short in managing risk. This paper draws on social and economic literature on market organization and an engineering perspective on control systems to suggest alternative approaches to risk management. This requires more explicit recognition of heuristics in decision-making, and a separation of optimization and stabilization processes.

Keywords: Calculators, control systems, financialization, financial risks, market design

JEL Classification:
D830: Search; Learning; Information and Knowledge; Communication; Belief; Unawareness
G5: Household Finance

1 Introduction

The Australian retirement system mandates a contribution of some 12% of "ordinary time earnings" into superannuation but requires choices about contributions over and above the minimum, when to retire and in what to invest. Individuals enjoy a mix of support mechanisms, including compulsion, marketing, nudges, financial information, and advice—all subject to protective regulation. Welfare benefits, including the Age Pension provide some financial security to those earning lower incomes, but the system is widely recognized as requiring an unrealistic level of financial literacy (Willis, 2021) or expensive financial advice (Levy, 2022).

The paper proposes several changes to risk management in the superannuation system, using the structure of the Moneysmart[1] website as a framework. Moneysmart is "a Federal Government website, brought to you by the Australian Securities and Investments Commission (ASIC)". Figure 1, overleaf, provides a visualization of the Moneysmart calculators and advice screens available across the lifecycle. The website identifies types of financial institutions and products, offering a wide range of decision-making support. Its primary focus areas are debt management (highlighted in the red box below the planning line) and investments (highlighted in the green box above). The central challenge of the financial lifecycle is managing expenditure over time, which typically involves earning a living, and borrowing or saving, because income and expenses rarely align. This explains the website's emphasis on debt and investments, both of which involve significant risks.

As a government-sponsored initiative, Moneysmart provides something of a standard for the financial information and the guidance and advice given to Australians by financial institutions and advisors. – even if this is not the intention. Its approach to risk management is however inadequate, creating perhaps an element of complacency in industry and amongst members. If made more effective, the Moneysmart website also offers a foundation for automated and less expensive financial guidance and even advice.

[1] https://moneysmart.gov.au (Accessed 11 February 2025).

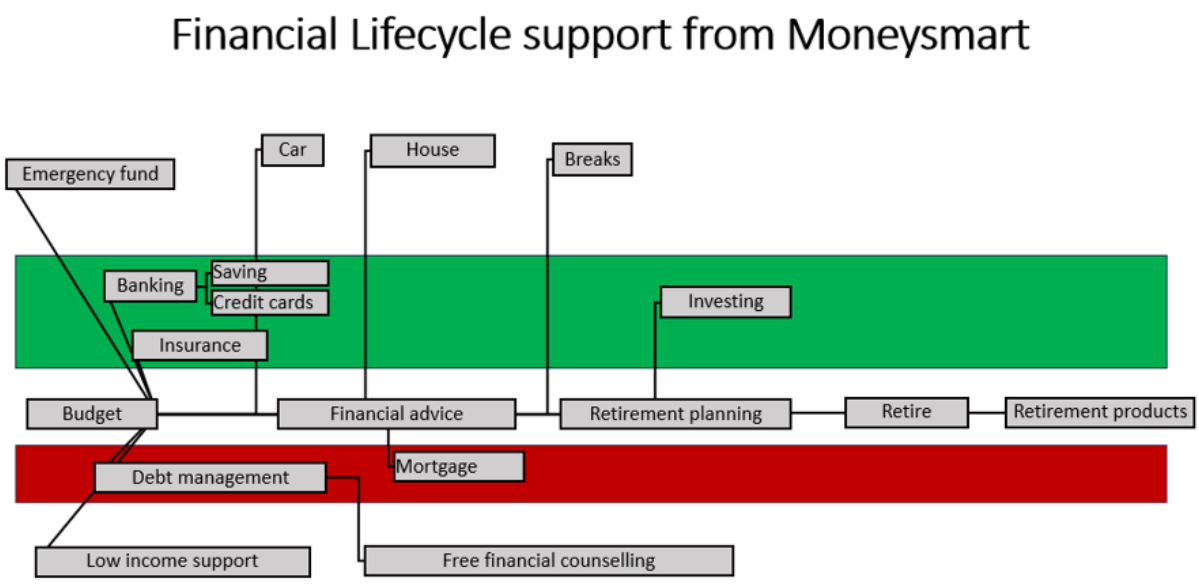

Figure 1: Moneysmart Coverage

Section two considers investment risk, and how Australians' exposure has been increased by the narrative of financialization: especially assumptions as to the value of investment choice. Few individuals, it seems, fully grasp the magnitude of the investment risks they face. The evidence presented suggests that return expectations are currently optimistic and that income in retirement is likely to somewhat lower than people are anticipating. The use of lifetime annuities to manage longevity risk is likely to be more important.

Section three critiques the Moneysmart website within this context. The financial lifecycle inherently involves controlling earnings, savings, and expenditures, so the critique is structured around a control system model proposed by Yakovis and Chechurin (2015). Their model separates optimization and stabilization and suggests that heuristics are needed to address complex decisions. It is hoped that this paper will provide some input into the government announcement (Treasury, 2024) that indicated further investment in Moneysmart.

2 Equity market risks

Financial systems have evolved differently across the globe, especially in the role played by investment choice. These differences stem from varying perspectives on the role of markets and how they can be designed. The narrative of financialization has been especially influential in Anglophone countries, shaping views on the economy and financial markets. However, evidence suggests that assumptions about individuals' ability to participate effectively in these markets and return expectations are overly optimistic.

2.1 Financialization

The value of the freedom to choose investments relies on two key assumptions: first, that individuals can exercise informed choice in financial markets, and second, that financial markets can deliver superior returns by allocating capital efficiently. These twin elements form the foundation of the financialization narrative, which observers like Hassel et al. (2019) and Himick and Brivot (2018) argue underlies the global shift to defined contribution (DC) retirement schemes. Financialization also refers to the growth of the financial sector relative to the rest of the economy.

The structure and much of the necessity of financial advice derive from these assumptions, but both can be questioned and appear to have unintended consequences. Frankel et al. (2019) suggest that policymakers and experts often become "fixated on markets as solutions to the most varied collective problems." This paper suggests that these assumptions must be critically examined to avoid persisting with solutions that are demonstrably unsatisfactory in important respects.

2.1.1 Choice and Financial Literacy

Informed choice requires financial literacy, which in turn depends on financial education. While enthusiasm for financial education is widespread, its effectiveness is universally deplored. Financial literacy is typically measured in the academic literature by the "big three" questions, discussed in Lusardi and Mitchell (2014):

> *1 .Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: [more than $102, exactly $102, less than $102? Do not know, refuse to answer.]*
>
> *2. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy: [more than, exactly the same as, or less than today with the money in this account? Do not know; refuse to answer.]*
>
> *3. Do you think that the following statement is true or false? 'Buying a single company stock usually provides a safer return than a stock mutual fund.' [Do not know; refuse to answer.]*

They report that only a third of adult US respondents are able to answer all three questions correctly—with the proportion similar in most other countries. Wilkins et al. (2022) reports average Australian scores—on five rather than three questions as 4.0 for males and 3.5 for females, which would probably mean that more than half were able to get all 5 questions correct. Willis (2021) cites research showing the ineffectiveness of financial education, noting perverse effects such as overconfidence, wasted time, and excessive trust in financial institutions. She argues that the current regulatory regime, by emphasizing individual responsibility, "socializes people to accept the financial marketplace."

Even Willis advocates for empowering consumers and mitigating the harms caused by poor choices. Most relevant to this paper is her support for performance-based regulatory approaches, such as Australia's "Design and Distribution Obligations" (DDO), which she elaborates on in Willis (2023). For Willis, the critical question is not how firms intended products to perform, but how they perform in real-world consumer interactions. Bateman et al. (2016) explore how members respond to investment disclosures, and while such studies are becoming more common, the behavioural responses they document are discouraging.

Fear and Pace (2008) highlighted the risks of unfettered investment choice in Australia and were among those advocating for mandatory default investment options, which led to the introduction of the MySuper defaults from January 2014.

2.1.2 Equity Market Risks

A second unwarranted assumption underpinning the current system is that equity investments will continue to significantly outperform all alternatives, so that forcing people to save and then encouraging them to choose risky portfolios is in their interest. The Moneysmart Retirement Planner (MSRP), for instance, suggests that a balanced investment option should be 70% in shares and property. This represents conventional wisdom. APRA (2025) reports an average exposure of the funds it supervises as being almost 60% to equities and another 15% in properties and infrastructure that are slightly less risky. If returns over the last century are repeated, 70% could be seen as too conservative. This is illustrated in Figure 2, which used US data from 1871 to show the size and volatility of investment in equities over an adult lifetime. While not available over such a long period, the Australian returns that are available from Dimson et al. (2024) have been similar – at about 6.5% p.a. greater than inflation. Figure 2 shows that at 60, an individual's balance would have varied from a low of 5 times annual income to about 22 times with a 70:30 investment strategy, and to 38 times with 100% equities.

This variance of average returns over long periods means that industry's standardized risk measure—the estimated number of negative annual returns over any 20-year period—fails to convey the risk of consecutive years of negative returns, which can lead to underperformance over several decades. This uncertainty is perhaps reflected in the wide range of projected investment returns used in calculators analysed by Super Consumers Australia (2024), a consumer advocacy body. They found projections ranging from 4% to 7.5%, resulting in a 42% difference in retirement balances for a representative individual just 17 years from retirement. Super Consumers Australia argue that some projections are unreasonable (either too high or too low) and recommend a single government endorsed source of guidance.

Projecting even the past century comes however with significant uncertainty and understate the risks of a future shortfall. The contributions and benefits have been chosen to ensure adequacy over the period. McQuarrie (2024) shows—using more recently available data going back two centuries in the US, and in the rest of the world in the twentieth century—that there have been long periods where stocks have underperformed alternatives. Dimson et al. (2024) also find worldwide equity returns outside the USA, have been 2% lower on average since 1900. This is equivalent to twice the standard deviation of US returns, so is statistically plausible as a future for US or Australian equities. Returns 2% lower than those realised would, however, have led to individuals running out of money before 90 in most of the periods shown. Siegel and McCaffrey (2023), drawing on insights from 12 leading investment experts, suggest lower returns should be expected given today's historically high markets. They caution against mechanically projecting past yields into the future.

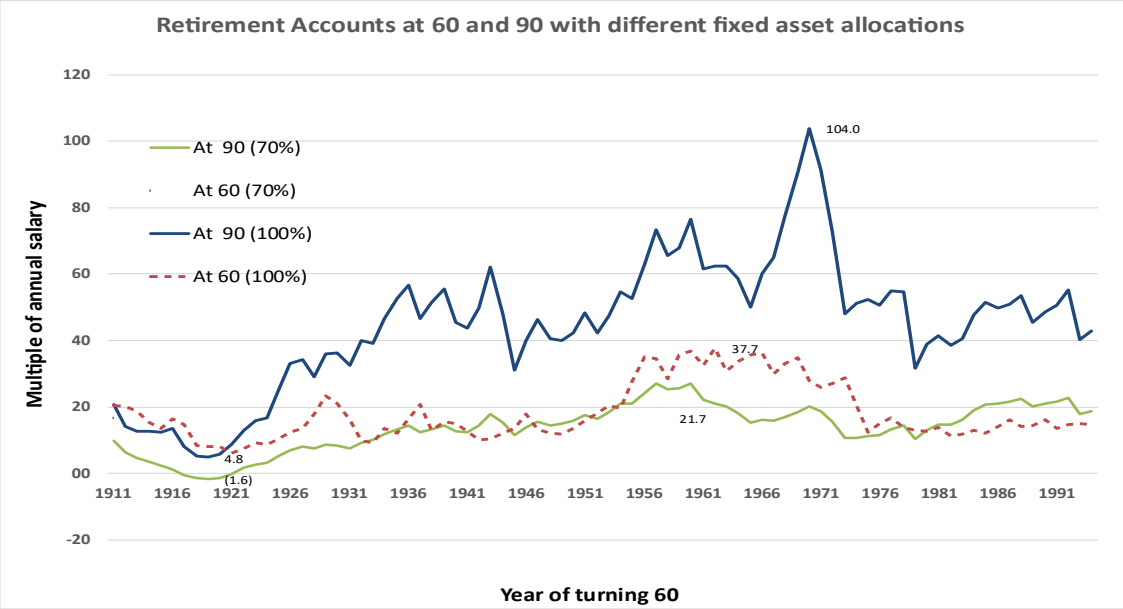

Figure 2: Volatility of Equity markets

The chart shows the impact of contributing 12% of income from age 20 to 60 and then drawing down 60% of income until age 90. The investment data is from Robert Shiller[2]: The equities are invested in the S&P500 and incur a charge of 1% p.a. The rest of the assets are invested in short deposits earning, given the data available, the long-term government interest rate. All numbers are in real terms – adjusted for inflation.

2.1.3 Excess demand and lower returns

An analysis of the profitability of Australian company confirms that lower returns are likely. Table 1 shows how the market value of listed and unlisted the shares issued by and held by Australian entities has significantly increased relative to GDP.

The value of all shares is currently 2.5 times GDP or roughly 5 times annual wages. This can be compared with the average balances that can be derived from the calculations underlying Figure 2. For the 100% equities strategy, equities worth about 18 times annual wages would be required; about 11 times for the 70% allocation. As can be seen from Table 1, superannuation funds compete locally and internationally with other shareholders: apart from other pension funds there are wealthy investors (especially in family-controlled businesses) and sovereign wealth funds.

[2] http://www.econ.yale.edu/~shiller/data.htm (Accessed 14 April 2025)

Table 1: Increasing prices relative to GDP

	%GDP			% Total shares		
	1988	2015	2024	1988	2015	2024
Net shares owned by Australians by issuer						
Local financial institutions	10%	50%	42%	13%	23%	16%
Local non-financial firms	50%	95%	114%	70%	45%	45%
In rest of the world	12%	68%	100%	17%	32%	39%
Ownership of these shares						
Households	38%	49%	58%	54%	23%	23%
Government	2%	10%	14%	2%	5%	5%
Super Funds & Life Insurers	13%	89%	111%	19%	42%	44%
By rest of the world	18%	62%	73%	25%	30%	29%
TOTAL	*71%*	*210%*	*255%*	*100%*	*100%*	*100%*

The table shows the estimated market value of listed and unlisted shares. The holdings of financial institutions other than super superannuation funds have been netted out in order to better understand ultimate ownership. Source: Author's calculations based on ABS5323048 and ABS5323049, which cover the period from June 1988.

Table 1 highlights various trends can be observed since the introduction of compulsory superannuation three decades ago, all of which support the hypotheses underlying the concept of financialization, and that its superannuation offspring has inflated the price of shares.

- Superannuation funds have replaced direct household ownership to a significant extent.
- The market value of locally issued shares relative to GDP has increased – from 60% to 156%.
- The market value of shares of financial institutions has increased twice as fast as non-financial corporations.
- Foreign ownership of Australian shares has increased but significantly less than Australian ownership of foreign shares, as superannuation funds have looked further afield for investment opportunities.

This 150% increase in the market value of shares in Australia has been accompanied by something less than a 40% increase in gross operating surplus – out of which profits are paid. It has thus led to a decline in the ratio of net surplus to share prices, which would be an indicator of market returns. While the statistics are noisy, potential yields may have fallen from over 5% to some 3.5%.

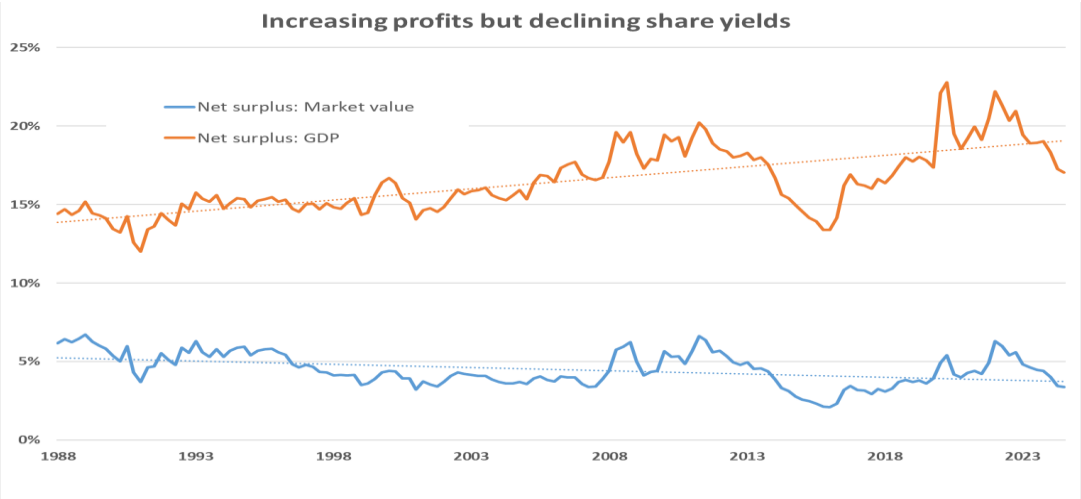

Figure 3: Reducing yields
The table shows the increase in net operating surplus (being gross less consumption of capital and excluding the operating surplus of private dwellings). Source: Author's calculations based on ABS5206007, ABS5206011 and ABS5206020, which cover the period from June 1988.

These calculations closely parallel the experience of listed shares. The price-to-earnings ratio (PER) of shares has risen in recent years as shown in Figure 4. The constituents of the ASX20 index, which account for half the market value of the stock market, have an average price to book value of over 2.5 and average earnings yield of about 3.5%

at time of writing.[3] Absent any rerating, and if the price to book values are representative, it is difficult to envisage future real returns greater than current market dividend yield of approximately 3.5%, which accords with the calculations above. Calculations based on published ASX indices suggest that dividends have grown in line with inflation, but no more, and given the low level of profit retention, this seems likely to continue.

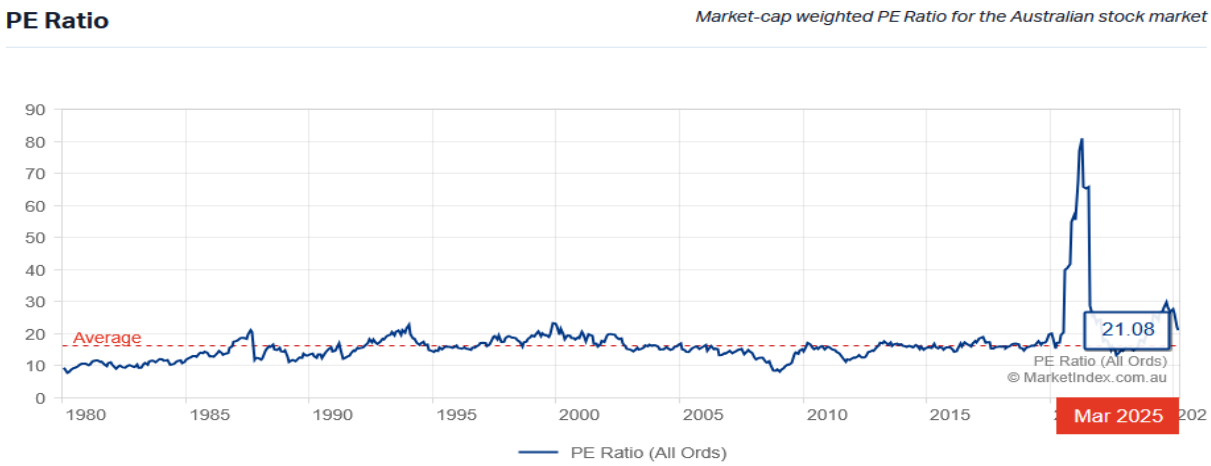

Figure 4: Long-Run PE Ratio *Source: https://www.marketindex.com.au/statistics (Accessed 14 April 2025)*

The MSRP projects real returns as 5% before retirement and 4% after. These are relatively conservative given commonly held expectations. Natixis (2023) surveyed investors and found that they expect long-term returns of 12.5% p.a., compared to 6.9% predicted by finance professionals, who tend to rely more on historical outcomes – and not allow for the impact of inflation in asset prices. If shares yield real returns of 3.5% and real interest rates are 1.5%, then adding franking credits and subtracting costs will not produce real total returns much above 3%.

Lower returns are also more realistic in that they produce much lower average balances that are more likely to be accommodated by investment markets.

2.1.4 Macroeconomic Dysfunction

The assumption of equity outperformance may have dysfunctional political and macroeconomic consequences. Nadler (2000) argued that encouraging share ownership could promote conservative politics. Pagliari et al. (2020) found little impact on overall political views but noted increased support for deregulating the financial sector and bailing out financial companies in 2008. They suggest that shareholder pressure influenced the US Congress to reverse its initial decision against the bailout. This aligns with the concept of common ownership, described by Gutiérrez and Philippon (2016) as where investment managers holding shares in multiple companies within the same industry discourage competition in the underlying markets. They find a connection with higher profits, inflated share prices, and reduced investment—so discouraging innovation that might threaten the profits of other companies in the same industry. Shareholders, and common owners in particular, can clearly also influence public policy with the same results. Low interest rates since 2008, quantitative easing by central banks, capital gains tax concessions and—in Australia—minimal land and resource taxes can all be seen to support higher asset prices.

One might at this point comment that land prices also seem to be artificially inflated by similar factors as investigated by Abelson and Joyeux (2023). Some of the consequent social disruption is described by Morris (2023).

It is also true that higher expectations of share returns can stimulate Keynes's 'animal spirits' and have likely increased investment in new technologies especially in the USA. On the other hand, expectations of unachievable higher returns can reduce investment in productive projects. Certainly, Edwards and Lane (2021) show that hurdle rates for new projects in Australian companies are much higher than the cost of capital. Together with most of the literature, they suggest a number of rational arguments for this observation – mostly concerned with risk aversion. Greenwood and Shleifer (2014) however show that the tendency to extrapolate past returns is common amongst

[3] Data obtained from https://www.marketindex.com.au/asx. (Accessed 14 April 2025)

not only among individual investors but also the writers of investment newsletters. The Natixis (2023) survey and the projections being made by superannuation funds suggest that it is also common amongst professional investors and Australian institutional investors. IFM Investors (2024), a large Australian owned investment manager, for instance, thinks of "risk-adjusted returns in the mid- to high-teens" for some infrastructural investments, which must limit their preparedness to invest at more reasonable rates.

3 Analysing Moneysmart

Given these systemic problems, this section evaluates whether the Moneysmart website and the MSRP adequately support Australians' retirement planning. The risks in the financial lifecycle require a control system whereby expenses and investments, and perhaps income, are made responsive to changes in circumstances. This applies whatever an individual's financial objectives, but this paper follows the definition of the objective of the system in the *Superannuation (Objective) Act 2024: "*to preserve savings to deliver income for a dignified retirement*"*. One consequence of the analysis of investment markets is that the economy cannot sustain large superannuation bequests.

3.1 Control Systems

Yakovis and Chechurin (2015), from a chemical engineering perspective, describe a process control system that can be usefully applied to the financial lifecycle. Their framework separates optimization and stabilization of the output. Optimization involves measuring and statistically analysing the underlying process. Stabilization requires one or more processes that are likely to include emergency margins.

3.1.1 Applying to the financial lifecycle

Their framework, with slight adaptation, can be applied to the financial lifecycle, as illustrated in Figure 5 below. The process is to control earnings, savings and investment.

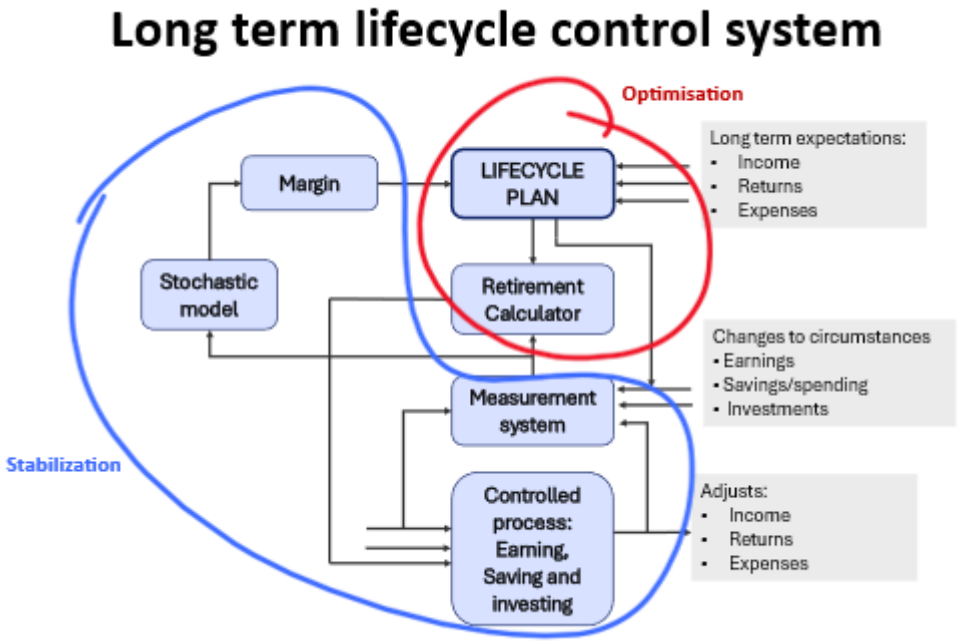

Figure 5: Long-Term Lifecycle Architecture

3.1.2 Heuristics

In practice, decisions are made heuristically, even if they are systematic, as demonstrated by financial advisors surveyed by De Ravin et al. (2018). Guidance on saving, investment and product followed different but necessarily simple rules. Yakovis and Chechurin (2015) argue that heuristics are inevitable in complex processes, citing three reasons that apply to the financial lifecycle:

First, by complexity we mean the practically uncountable number of possible variants of control that makes the trial and error approach too time demanding even for advanced computational resources.

Second, complexity stands for the interconnection of subsystems and system variables. It becomes hard (inaccurate) to single out certain units or a subset of variables to reduce the dimension.

Third, the complexity reflects the nature of real control processes, that cannot be described by the extensive language of linear analysis.

Given that the financial lifecycle is no more predictable or linear than engineering processes, the use of heuristics is unavoidable. Such heuristics could be sufficiently simple to be incorporated into more automated and thus more affordable financial advice.

3.2 Moneysmart as a Control System

Figure 5, above, provides a template for analysing Moneysmart and suggesting how it (and the industry's guidance and advice model) might be developed into a lifecycle control system. Its existing strengths include breaking down decisions into a sequence of smaller blocks and offering resources for those facing financial hardship. However, it displays only rudimentary measurement and stabilization systems, and risk management is inadequate. There is no stochastic model, and the only margin suggested is an arbitrary "emergency fund" of three months' expenses

3.2.1 Revisiting Plans

Financial plans need periodic review to adjust behaviour as necessary. ASIC's Regulatory Guide 276 requires that users be able to "readily print or electronically store" outcomes. While the MSRP includes a reminder to review plans after six months, it does not allow users to save their current projections for future updates. Although browsers can print the MSRP output screen by screen, users should be able to download inputs and outputs for easy reloading during subsequent reviews.

The absence of a storage mechanism means there is no measurement system to analyse deviations from expectations or address them appropriately. Addressing such deviations requires an understanding of stochastic variation and appropriate margins:

- Should the deviation be treated as a statistical anomaly, or does it necessitate changes to underlying assumptions?
- Does the deviation require adjustments to spending, investment, or earnings?

3.2.2 Risk Management

Moneysmart provides limited warning of risks and their management. In particular, the focus on investment risk reflects the financialization paradigm as if investment success was the objective of the system. Longevity risk is entirely ignored. Risk is defined as "the possibility that your investment may fall in value or earn less than expected."

Risk tolerance is framed as a psychological construct: "the degree of uncertainty you are prepared to accept in relation to investment returns, in particular the extent to which you are prepared to experience a negative investment return while trying to achieve positive investment returns." However, the primary risk is an objective impairment of retirement outcomes: poor investment returns or failure to manage longevity risk can disrupt one's lifestyle due to insufficient resources. Psychological consequences may follow, but the outcomes are fundamentally material. Ironically, members in accumulation phase are better off after negative investment returns, because they can buy assets at lower prices.

3.2.3 Investment Risk

Moneysmart's treatment of investment risk is superficial and likely to foster overconfidence, which Willis (2021) reports amongst partially financially literate individuals. The MSRP uses default nominal returns of 7.5% (accumulation) and 6.5% (retirement), with an inflation rate of 2.5%. It does not specify the type of portfolio these defaults represent. While these assumptions are already a little optimistic in current circumstances, users can input their own investment return assumptions, up to a very misleading 20% p.a.

A case study on the website[4] suggests investing 60% in shares, 20% in property, and 20% in bonds for a five-year house deposit savings plan. Simonsen and Hermo (2021) analyse rolling U.S. returns for such a portfolio since 1970 (excluding most of the 1970s' negative returns and the 1930s' depression). They report negative returns in 2.7% of cases and negative returns on shares based on "golden rules" such as reviewing fees, monitoring company reports, and avoiding scams. There is no warning that individual investors typically underperform the index, nor is the index even mentioned as a benchmark. Over-trading, linked to gender and overconfidence (Barber and Odean, 2001), and the risk of overpriced shares in growing industries are also overlooked. As Bodie (2003) notes, "increasing the number of choices does not necessarily make [individuals] better off. In fact, it may make them more vulnerable to exploitation by opportunistic salespeople or by well-intentioned but unqualified professionals." Linnainmaa et al. (2021) found that the financial advisors they analysed were poor investors themselves and so reduced their clients' investment returns.

Informed investment requires intensive research and expertise in accounting, economics, and investment management. The investment modules understate the risks of selecting individual shares, sectors, or markets. The website should provide clear warnings that investment choice is best left to professionals unless you have the necessary knowledge and time. It would be preferable to relocate the investment modules to avoid implying that anyone can invest well with minimal effort. In particular, it would be helpful to disabuse members of the notion that share prices always recover in the medium term.

3.2.4 Longevity Risk

The MSRP fails to address the longevity risk of superannuation income. In line with ASIC's Regulatory Guide 276, it assumes the drawdown of an account-based pension (ABP) by age 91 for all retirement ages (60–75) and calculates the sustainable income until then Thereafter, users will be reliant on the Age Pension or their families. Users can input an alternative exhaustion age, but no guidance is provided on its appropriateness. The Actuaries Institute (2022) notes that using the Australian Life Tables of the time, 25% of 67-year-old males are projected to live to 91, with even higher figures for females and couples.

Annuitization provides complete insurance against longevity risk and should clearly be seen as a default. At very least retirement illustrations should, in the first instance, illustrate the pension from an investment linked annuity with a conservative investment strategy. An account-based pension can be offered as second-best option. From an optimization perspective, investment-linked lifetime annuities can replicate the investments of a drawdown account and should provide greater spending at every age—if charges are reasonable. There is little urgency to encourage this decision until individuals are fully retired, which may not occur until their seventies for some. This is because the mortality credit from annuitization is less than 1% p.a. of balances for a 70-year-old female but rises to 3% p.a. by 80 and increases rapidly thereafter.

Two decisions are required at the time of annuitization: the size of a short-term emergency buffer and the assumed interest rate. The buffer should cover planned lump-sum expenses (e.g., home renovations, travel), unexpected expenses and poor investment returns, and is discussed in 3.3 below.

The assumed interest rate determines the shape of annuity payments over time. A higher rate results in higher initial payments but lower long-term payments. The decision depends on expectations of inflation, investment returns, and changes in expenses during retirement. Research on consumption patterns during retirement is complicated by data accuracy and representativeness issues, as well as the need for longitudinal measurement. Cross-sectional surveys often fail to account for the increased wealth of younger cohorts, while longitudinal surveys may not adequately adjust for the death of one spouse. The UK survey by Crawford et al. (2022) shows no average reduction in real individual consumption, while ABS data analysed by Coates et al. (2025) shows a decline in equivalized spending for those born in the 1930s but not for those born in the 1940s, possibly due to improved health in later cohorts. Matching the CPI seems a reasonable heuristic, with a 30% reduction in income on the first death.

3.2.5 Other risks

The Moneysmart websites provides links to some of the resources available to those who suffer other losses, including sickness, unemployment and divorce. They are however not discussed as risks that—in the case if sickness—are partly insurable. The government Newstart allowance is not mentioned, although it can provide during

[4] https://moneysmart.gov.au/how-to-invest/diversification (Accessed 11 February 2025).

periods of unemployment, and so has a bearing on the size of an emergency buffer. The high cost of divorce is not mentioned, nor that seeking counselling is often effective in preventing unnecessary divorces, as shown by Gottman and Gottman (2017).

3.3 Stabilization

A stabilization system requires a model of variability to determine an adequate margin, a measurement system to track that variability, and a set of heuristics to adapt decisions to new circumstances. Income, essential expenses, and investment returns vary over time and can be modeled as random variables. The stochastic models underlying the development of adaptive heuristics can be as sophisticated as necessary—given that members do not need to understand their working. There might be a place for detailed models of income progression, mortality and expense variability, but these are probably swamped by the uncertainty of investment return projections.

The variability of income and expenses can be reduced through appropriate insurance, while investment risk can be mitigated by reducing exposure to volatile assets. There is also a need – throughout life – to be able to access emergency funds from liquid assets. The buffer account is short-term and should be periodically replenished, making it unsuitable for inclusion in a superannuation drawdown account—though it can initially be held there. Holding funds outside superannuation is unlikely to be problematic, because all drawdown payments must be paid into bank accounts, and the buffer could be held there.

Other buffers can sometimes be used: working longer, cutting expenses and accessing home equity as well as support from family and friends. All can perhaps be mentioned. In the last resort, there is the support of the welfare system.

3.3.1 Earned Income

Cebulla (2020) highlights significant dispersion in Australians' wage growth rates, influenced by personality, skills, and employer characteristics. The most recent data, available from the ATO, as proposed by Asher and de Ravin (2020) could be used to provide this information directly or through an updated Moneysmart platform, as suggested earlier.

Scenarios could be run to illustrate how future earnings and retirement dates might vary, particularly in connection with health shocks or accidents, emphasizing the need for insurance. The MSRP should also be updated to reflect this dispersion and its impact on retirement income. Earnings projections should include likely s, as individuals may need to be alerted to the need for ongoing investment in their human capital to extend their working lives. Chinetti (2024) provides evidence that unexpected changes to the standard retirement age increase participation in training courses, indicating that people can take early action to prepared themselves for a delayed retirement. Current calculator defaults are likely too optimistic. The Age Pension age (67) overstates average retirement ages, as many face earlier, often involuntary, retirement. OECD (2023), however, reports "growing employment at older ages" across countries since 2000, with Australia near the average, showing a 20% increase. While possible for some, working longer does not seem available to all. The average age of those retiring in the past year appears to have increased to around 65, with women retiring two or three years earlier than men[5]. Salary increases also slow after the mid-forties for men and mid-fifties for women, with differences of perhaps 1% p.a. after 50 and 2% p.a. after 60[6]. Projections should not assume average wage increases throughout life.

Current longevity trends make it critical to ensure updated information is available to all market participants. Beard et al. (2024) find dramatic increases in intrinsic physical and cognitive capacity in recent cohorts, with 68-year-olds born in 1950 having greater capacity than 62-year-olds born a decade earlier.

The Moneysmart recommendation of maintaining an emergency fund equivalent to three months' expenses seems reasonable while working.

---

[5] https://www.abs.gov.au/statistics/labour/employment-and-unemployment/retirement-and-retirement-intentions-australia/latest-release#key-statistics (Accessed 14 May 2025).

[6] https://www.canstar.com.au/savings-accounts/average-aussie-earn-save-owe/ (Accessed 11 February 2025).

3.3.2 Expenses

In terms of useful heuristics, ancient maxims about not spending more than your income and avoiding debt remain relevant. Individuals on the minimum wage, welfare, or in rented accommodation have limited scope to manage expenses, but their needs are addressed in the current Moneysmart configuration—and they may not require a detailed retirement plan. Others, however, can more easily adjust their expenses. As Asher et al. (2024) find that medical costs can be reduced by dropping private health insurance. Individuals can often relocate to areas with lower housing costs or reduce discretionary spending. ASFA (2024) suggests that a modest lifestyle is achievable with as little as a 10% enhancement to the Age Pension.

Projected expenses should also include a margin for deviations from expectations, and there is a need for larger emergency buffer in retirement as medical costs increase. Fulford (2015) suggests target buffers of between three and twenty months of consumption – even for retirees facing the uncertain medical costs of the USA. McRae et al. (2013) report that a fifth of Australians with 5 or more chronic conditions are paying more than 20% of their income for health care, but the average was less than $900 per quarter in 2009. While costs have escalated, a buffer of 12 months of expenditure should cope with a few years of higher medical costs. Aged care costs, often another liquidity concern, are heavily subsidised and means tested so are always affordable.

3.3.3 Investment Returns

As discussed in section 2.1.2, the investment of a significant proportion of retirement accounts will lead often lead to large losses and gains, requiring a strong stabilization system to avoid financial hardship or excessive accumulation of assets. Bodie (2003), Antolin et al. (2009), and Mantilla-Garcia et al. (2024) propose alternatives to current practices that include changes in asset mix, accounting practices, employer or government guarantees, and alternative instruments. Asher and Rajadurai (2018) propose further alternative investments that return the cash flows from long term investment projects directly to members. Retirement benefits should not be largely determined by share market fluctuations, not only due to personal risks but also because of the economic and social disruption of excessive asset prices.

The options currently available to superannuation members are changes to asset mix, and changes to the timing and size of contributions and drawdowns. Figure 2 showed how the recommended 70:30 split between equities and interest-bearing instruments would have reduced both volatility at the expense of lower benefits for every cohort modelled. However, standard lifecycle portfolio choice theory, as outlined by Gomes (2020), uses statistical modelling that generates a wide range of outcomes, and suggests that there are benefits to a more cautious approach – especially lifecycle strategies that reduce risk as people age. Australian MySuper products do offer default investment strategies with less risk, but only a third[7] use a lifecycle approach.

Figure 7 looks at how retirement balances at 60 and 90 with more conservative return projections. The same Shiller database is used for investment returns with about a 2% p.a. lower return. The lower returns means that amount drawn down is reduced to only 36% of income. Exposure to equities linearly from 100% at age 50 to 50% at age 90. Two other stabilising techniques are applied. The hypothesis that weight of funds can periodically lead to inflated asset prices is consistent with the findings of Jivraj and Shiller (2017) that Shiller's Cyclically Adjusted Price to Earnings ratio (CAPE) can be a good predictor of future returns. As an illustration equity exposure was reduced by 70% when the CAPE ratio has exceeded 17 for each of the past 60 months.[8] This had the effect of reducing volatility and increasing returns. A second technique was to allow early retirement from age 50 if balances exceeded the value of annuity until 90 calculated at an interest rate of 1% p.a. This reduced the variation of balances at 60.

The average balance over the period would still be 7 times annual wages, which means there might still be a tendency to inflate asset prices. This is reflected in that balances at 90 can be higher than those at 60, which is consistent with the findings of Spicer et al. (2016) that retirees can accumulate assets after retirement especially when share prices are rising. This is often explained as a result of a bequest motive, but Caplin (2021) suggests that more careful probing identifies the precautionary motive as stronger. Figures 2 and 7 add another perspective: retirees may not want to adjust their living standards just because their assets are rising. It may not be reasonable to expect them significantly increase consumption, but neither is it reasonable for generations to take the risk of

[7] https://www.superguide.com.au/comparing-super-funds/mysuper-funds (Accessed 11 February 2025).

[8] A more scientific approach would clearly be justified in practice.

potentially exhausting their balances. Under these circumstances, it would seem that the best advice would be to take low risk lifetime annuities.

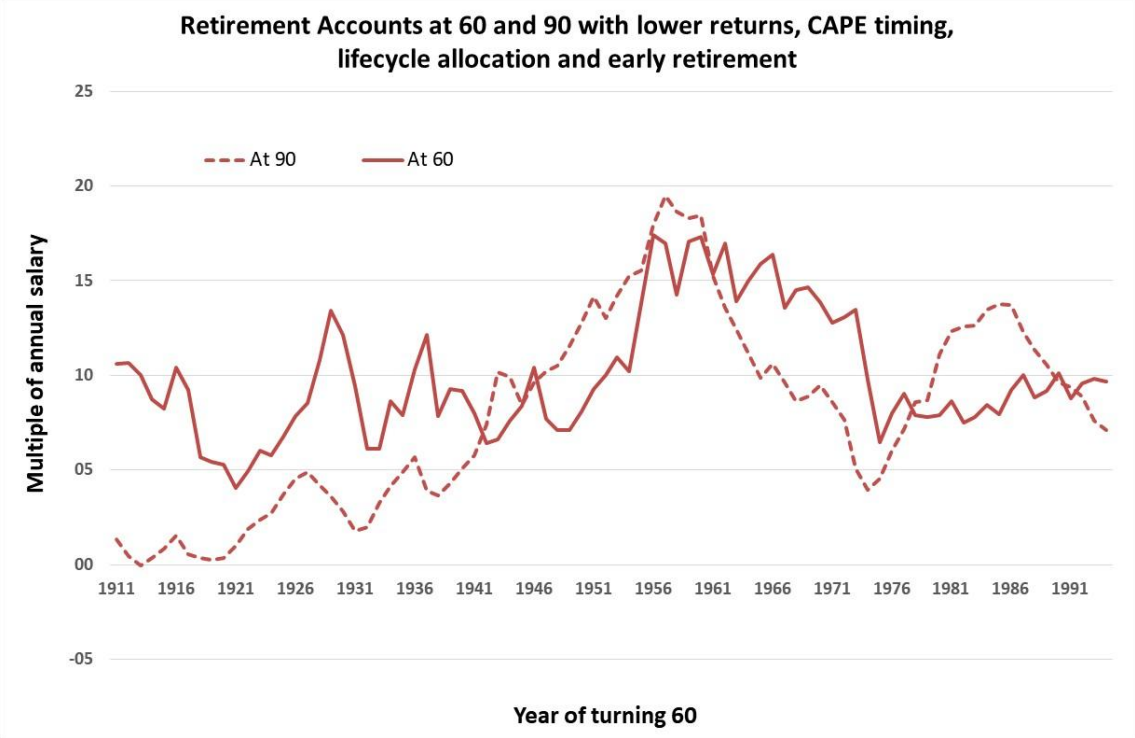

Figure 7: Lifecycle assets with stabilization but lower returns
As for Figure 2, The chart shows the impact of contributing 12% of income from age 20 to 60 but then drawing down only 36% of income until age 90. The equities are invested in the S&P500 and incur a charge of 3% p.a.to illustrate lower returns and the proportion reduces from 100% at age 50 to 50% at 90. The rest of the assets earn the long-term government interest rate. Early retirement takes place after age 50 if balances are 20% larger than an annuity to age 90 at an interest rate of 2%. All numbers are in real terms – adjusted for inflation.

As proposed in Section 3.2.3, most investment guidance on Moneysmart should be removed and left to specialist investment educators. At most, Moneysmart could explain the difference between equities and lower-risk investments, along with the associated uncertainties. This suggests that trustees, investment managers, and regulators need to rethink the nature of investment risks and how markets can be designed to reduce them.

In the absence of low-risk lifetime annuities, there is a need to explain potential variations in outcomes so that individuals can make informed decisions and prepare for the risks. The lack of discussion on long-term investment risks and inadequate risk disclosures—such as the volatility illustrated in figures 2 and 7—suggests that few Australians understand the investment risks they face. At very least they should be given a range of returns, which are relatively easy to explain, understand, and compute. The UK Financial Conduct Authority (FCA) regulations, for example,[9] set lower, intermediate, and higher pre-tax projection rates at 2%, 5%, and 8%, respectively. This approach, previously used in Australia until the early 1990s, produces upper and lower replacement ratios after 40 years that vary by a factor of 4. This is in line with the sophisticated modelling of Antolin et al. (2009) and experience of the 70:30 model shown in Figure 2. The current environment might suggest illustrations 1% to 2% lower. Under these circumstances, low risk lifetime annuities would appear more attractive.

Illustrating equity risk in the drawdown phase is more difficult. Scenarios provide a better picture of year-by-year variation, which is crucial for illustrating payouts from equity-linked account-based pensions or lifetime annuities. While more complex to explain and compute, they offer a basis for determining an appropriate cash margin for investment volatility and rules for drawing down cash during periods when markets underperform. As suggested in

[9] Financial Conduct Authority (FCA) Handbook, https://www.handbook.fca.org.uk/handbook/COBS/13/Annex2.html (accessed 25 November 2024)

section 3.3.2, a cash reserve covering one to two years of expenses appears to be a common and probably not unreasonable, heuristic.

4 Summary

The Australian superannuation system relies on equity investments that are unlikely to meet the expectations of its participants. Members do not appear to be informed about the risks, which history shows to reward some generations much more than others. It appears that the funds accumulated have already outgrown the available assets in Australia and international diversification is unlikely to solve the problem. It has therefore artificially inflated asset prices, so that the current return expectations suggested are over-inflated. The Moneysmart retirement calculator, as a representative of the industry is both too optimistic and misleads users as to the extent of the investment risks they face.

Retirement planning requires a control system that considers both optimisation and stabilization of benefits in retirement. Stabilization seems to be glossed over in most planning. The Moneysmart stabilization subsystem needs significant development, incorporating explicit risk margins and a measurement system that enables sensible adaptations of consumption and investments.

The MSRP could play a central role but must be better adapted to risk management. It should allow users to save their financial plans for ongoing monitoring and adaptation. The Moneysmart website should limit its attempts to provide investment education, which risks fostering overconfidence. Significant investment in retirement exposes retirees to unreasonable risks for the possibility of making higher returns from which they will gain no advantage. There are significant advantages in lifetime annuities backed by low-risk investments.

References

Abelson, P. and Joyeux, R. 2023. Housing Prices and Rents in Australia 1980-2023: Facts, Explanations and Outcomes (September 21, 2023). TTPI - Working Paper 14, Available at SSRN: https://ssrn.com/abstract=4591845 (Accessed 6 May 2025)

Actuaries Institute, 2022. *Submission on Consultation Paper 351: Superannuation forecasts: Update to relief and guidance*. https://www.actuaries.asn.au/Library/Submissions/Superannuation/2022/20220128SubmissionASIC.pdf (Accessed 16 April 2025)

Antolin, P., Scheuenstuhl, G.F., Blome, S., Karim, D., Payet, S. and Yermo, J., 2009. *Investment regulations and defined contribution pensions*. OECD Working Papers on Insurance and Private Pensions, No. 37.

APRA, 2025. Quarterly Superannuation Industry publication. https://www.apra.gov.au/quarterly-superannuation-industry-publication (Accessed 12 May 2025)

ASFA, 2024. ASFA Retirement Standard Detailed budget breakdowns, June quarter 2024. The Association of Superannuation Funds of Australia, Sydney.

Asher, A., Boonen, T., Chang, L., Khemka, G. and Roberts, S., 2024. Heterogeneity in needs and purchases in Australian retirees. *Accounting & Finance*, *64*.2, 2209-2247.

Asher, A. and De Ravin, J., 2020. Submission to the Senate Select Committee on Financial Technology and Regulatory Technology: Reforming financial advice – providing data. www.aph.gov.au/DocumentStore.ashx?id=2203b0a0-e14a-4ab9-abb9-0580387cc43d&subId=699715 (Accessed 11 February 2025).

Asher, A. and Rajadurai, E., 2018. *Investing Superannuation for the Public Good: Creating new markets to benefit members & fund necessary investments,* The McKell Institute. mckellinstitute.org.au/app/uploads/FINAL_Superannuation_2018_WEB.pdf (Accessed 11 February 2025).

Barber, B.M. and Odean, T., 2001. Boys will be boys: Gender, overconfidence, and common stock investment." *The Quarterly Journal of Economics* 116.1, 261-292.

Bateman, H., Dobrescu, L.I., Newell, B.R., Ortmann, A. and Thorp, S., 2016. As easy as pie: How retirement savers use prescribed investment disclosures. *Journal of Economic Behavior & Organization,* 121, 60-76.

Berg, G. and Zia, B., 2013. Harnessing emotional connections to improve financial decisions: Evaluating the impact of financial education in mainstream media. *World Bank Policy Research Working Paper*, (6407).

Bodie, Z., 2003. Thoughts on the future: Life-cycle investing in theory and practice. *Financial Analysts Journal*, *59*.1, 24-29.

Caplin, A., 2021. *Economic data engineering*. National Bureau of Economic Research. Working Paper 29378.

Cebulla, A., 2020. Privileging wage and salary increases? Who asks, gets, doesn't ask or doesn't get a raise in Australia. *Labour & Industry: a journal of the social and economic relations of work*, *30*.3,191-215.

Chinetti, S., 2024. Late-in-life investments in human capital: evidence on the (unintended) effects of a pension reform. *Empirical Economics*, *66*.6, 2723-2760.

Coates, B., Moloney, J., and Suckling, E., 2025. *Simpler Super: Taking the stress out of retirement.* Grattan Institute.

Crawford, R., Karjalainen, H. and Sturrock, D., 2022. *How does Spending Change through Retirement?* IFS Report No 209.

De Ravin, J. Scully, P., Hennington, J. and Orford, D., 2018. *We asked how 2,500 planners formulate retirement income advice* www.actuaries.asn.au/Library/Events/FSF/2018/AdviceToPreRetireesPaper.pdf (Accessed 5 February 2025)

Dimson, E., Marsh, P. and Staunton, M., 2024. *UBS Global Investment Returns Yearbook: Summary Edition 2024.* UBS.

Edwards, H. and Lane, K., 2021, 'Why are investment hurdle rates so sticky?', *RBA Bulletin*.

Fear, J. and Pace, G., 2008. *Choosing Not to Choose*. The Australia Institute.

Frankel, C., Ossandón, J. and Pallesen, T., 2019. The organization of markets for collective concerns and their failures. *Economy and Society*, 48.2, 153-174.

Fulford, S.L., 2015. The surprisingly low importance of income uncertainty for precaution. *European Economic Review*, 79, 151-171.

Gomes, F., 2020. Portfolio choice over the lifecycle: A survey. *Annual Review of Financial Economics*, 12.1, 277-304.

Gottman, J. and Gottman, J., 2017. The natural principles of love. *Journal of Family Theory & Review*, *9*(1), pp.7-26.

Greenwood, R. and Shleifer, A., 2014. Expectations of returns and expected returns. *The Review of Financial Studies*, *27*.3, 714-746.

Gutiérrez, G. and Philippon, T., 2016. *Investment-less growth: An empirical investigation* National Bureau of Economic Research w22897.

Hassel, A., Naczyk, M. and Wiß, T., 2019. The political economy of pension financialisation: Public policy responses to the crisis. *Journal of European Public Policy*, *26*.4, 483-500.

IFM Investors (2024) *Embracing the Infrastructure Evolution*. https://www.ifminvestors.com/siteassets/shared-media/news--insights-pdfs/infra-outlook-2024/ art_ifm631_infra_outlook_total_v7.pdf. (Accessed 16 April 2025)

Jivraj, F. and Shiller, R.J., 2017. The many colours of CAPE. Yale ICF Working Paper No. 2018-22, Available at SSRN: https://ssrn.com/abstract=3258404

Levy, M, 2022. Quality of Advice Review, Final Report. The Treasury, Canberra.

Linnainmaa, J.T., Melzer, B.T. and Previtero, A., 2021. The misguided beliefs of financial advisors. *The Journal of Finance*, *76*.2, 587-621.

Lusardi, A. and Mitchell, O.S., 2014. The economic importance of financial literacy: Theory and evidence. *American Economic Journal: Journal of Economic Literature*, *52*.1,5-44.

Mantilla-Garcia, D., Martellini, L., Garcia-Huitrón, M.E. and Martinez-Carrasco, M.A., 2024. Back to the funding ratio! Addressing the duration puzzle and retirement income risk of defined contribution pension plans. *Journal of Banking & Finance*, *159*, 107061.

Morris, A., 2023. Housing and inequality in Australia. *The economic and labour relations review*, *34*.1, 86-103.

McRae, I., Yen, L., Jeon, Y.H., Herath, P.M. and Essue, B., 2013. Multimorbidity is associated with higher out-of-pocket spending: a study of older Australians with multiple chronic conditions. *Australian journal of primary health*, *19*(2), pp.144-149.

McQuarrie, E.F., 2024. Stocks for the long run? Sometimes yes, sometimes no. *Financial Analysts Journal*, *80, no.* 1:12-28.

OECD, 2023. Pensions at a Glance 2023: OECD and G20 Indicators, OECD Publishing, Paris.

Nadler, R., 2000. Portfolio Politics Nudging the investor class forward. *National Review,* 52.23, 38-41.

Natixis Investment Managers, 2023. *Natixis Global Survey of Individual Investors* www.im.natixis.com/content/dam/natixis/website/insights/investor-sentiment/2023/2023-individual-investor-survey/2023-Natixis-Global-Survey-of-Individual-Investors-Full-Report.pdf (Accessed 12 December 2024.)

Pagliari, S., Phillips, L.M. and Young, K.L., 2020. The financialization of policy preferences: financial asset ownership, regulation and crisis management. *Socio-Economic Review*, *18*.3, 655-680.

Siegel, L.B. and McCaffrey, P. (eds.), 2023. *Revisiting the Equity Risk Premium*. CFA Institute Research Foundation.

Simonsen, L.A.F. and Hermo, M., 2021. A review of Bridgewater Associates investment strategy: The all-weather portfolio. Master's thesis, NTNU.

Spicer, A., Stavrunova, O. and Thorp, S., 2016. How portfolios evolve after retirement: evidence from Australia. *Economic Record*, *92 (*297), 241-267.

Super Consumers Australia, 2024. *Can We Count on Them? Assessing the usefulness of Super Fund Retirement Calculators.* superconsumers.com.au/wp-content/uploads/2024/09/Calculators-report-final-1.pdf (Accessed 11 February 2025).

Treasury, 2024. *Improving the retirement phase of superannuation.* treasury.gov.au/sites/default/files/2024-11/p2024-604912-retirement-phase-super-factsheet.pdf (Accessed 27 December 2024)

Wilkins, R., Vera-Toscano, E., Botha, F, Wooden, M. and Trinh. T. 2022. The Household, Income and Labour Dynamics in Australia Survey: Selected Findings from Waves 1 to 20. Melbourne Institute: Applied Economic & Social Research, University of Melbourne.

Willis, L.E., 2023. Performance-Based Consumer and Investor Protection: Corporate Responsibility without Blame. In Bant, Elise (ed.), *The Culpable Corporate Mind.* Bloomsbury Publishing.

Willis, L.E., 2021. Alternatives to financial education. In Nicolini, G., and Cude, B. J. (eds.) *The Routledge handbook of financial literacy* (274-292). Routledge.

Yakovis, L., & Chechurin, L. (2015). Creativity and heuristics in process control engineering. *Chemical Engineering Research and Design*, *103*, 40-49.